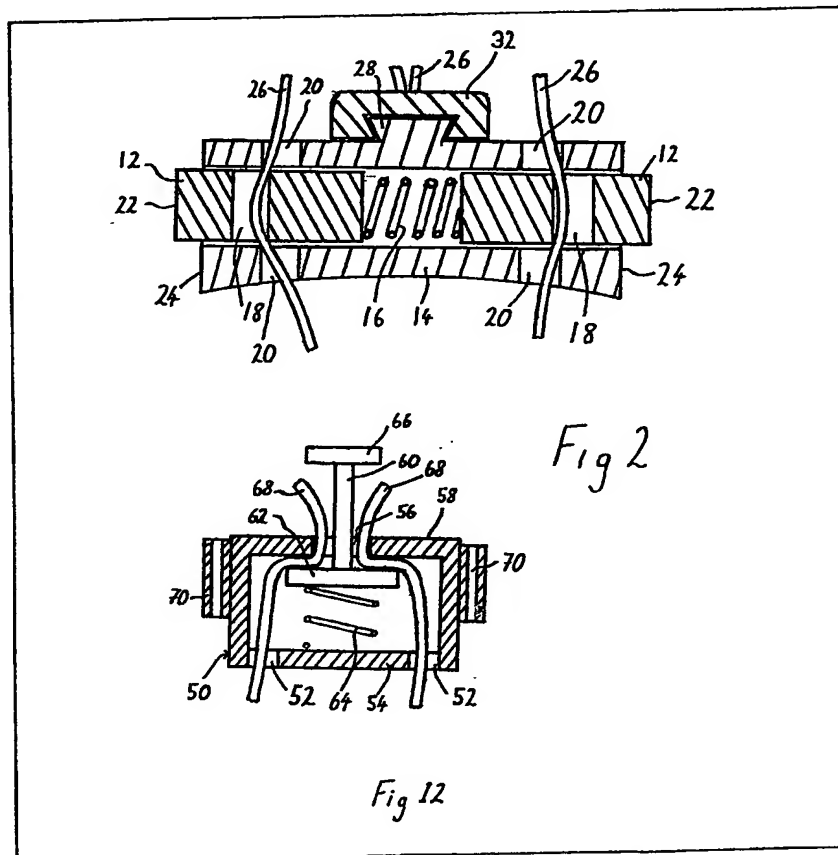


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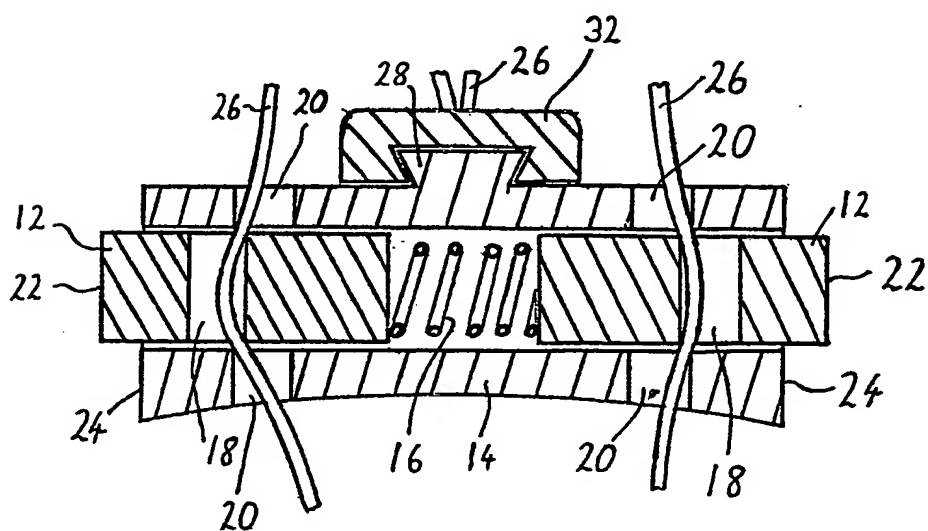
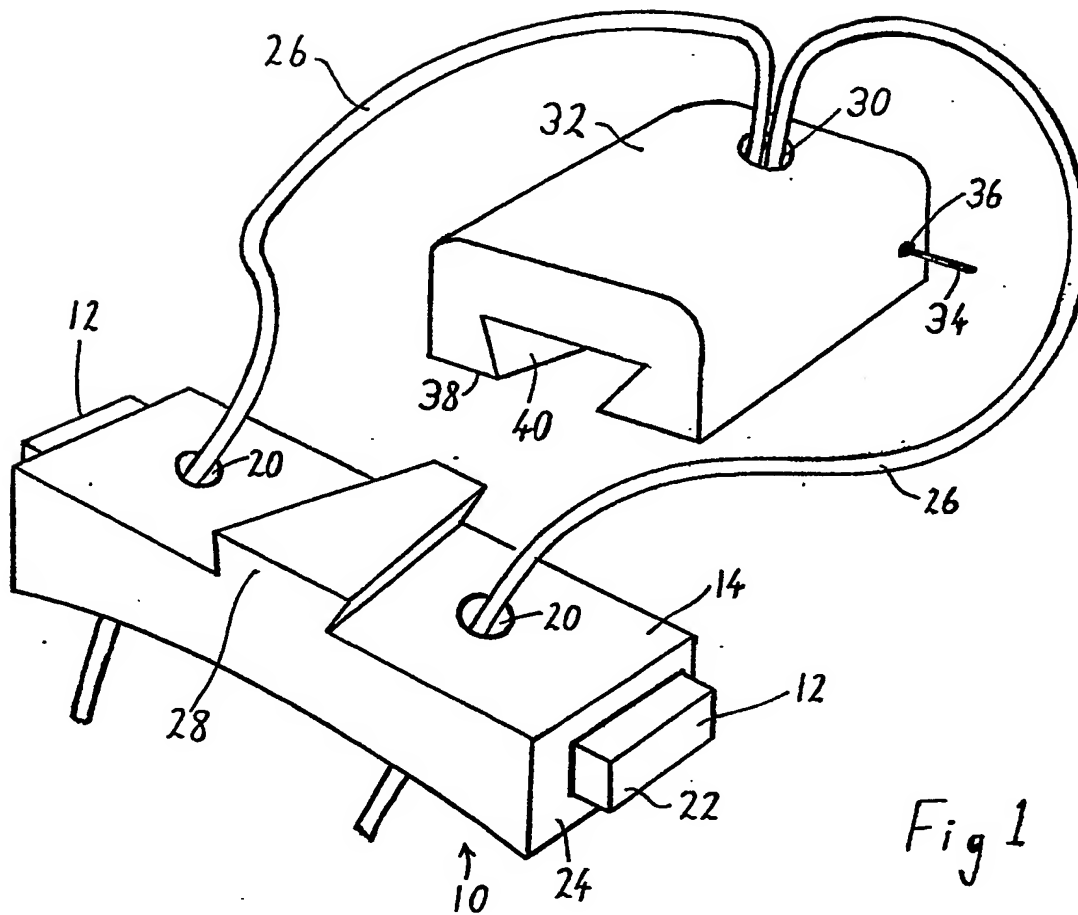
(54) Cord securing device

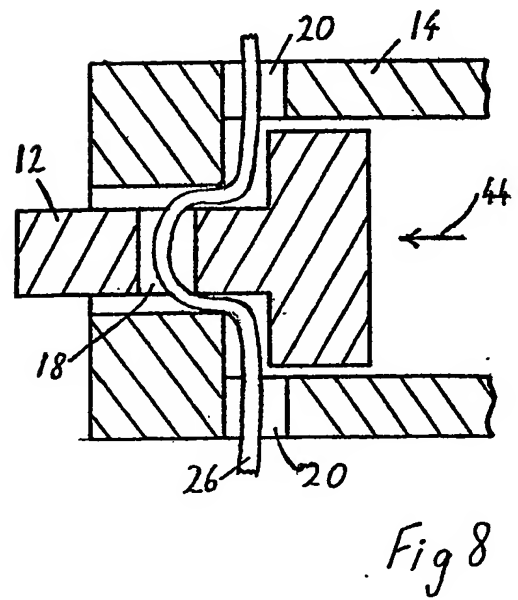
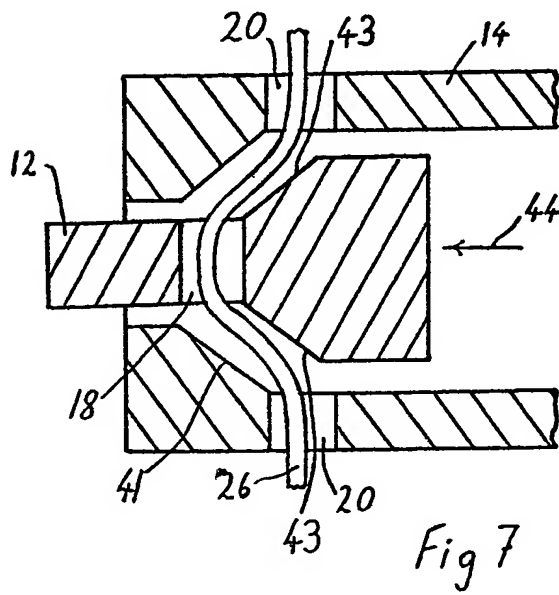
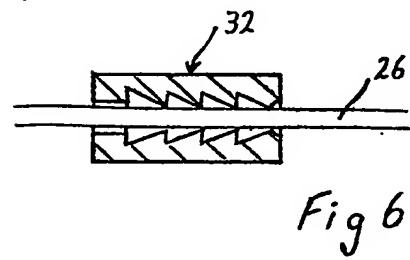
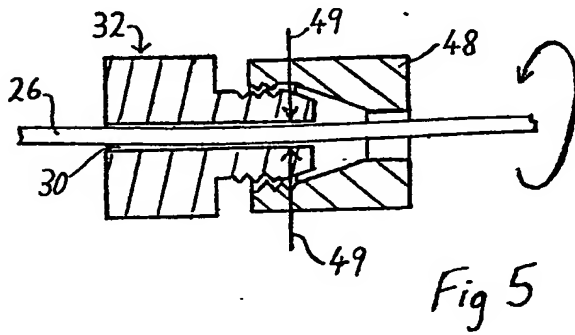
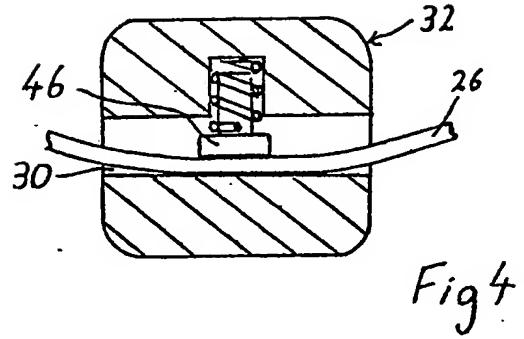
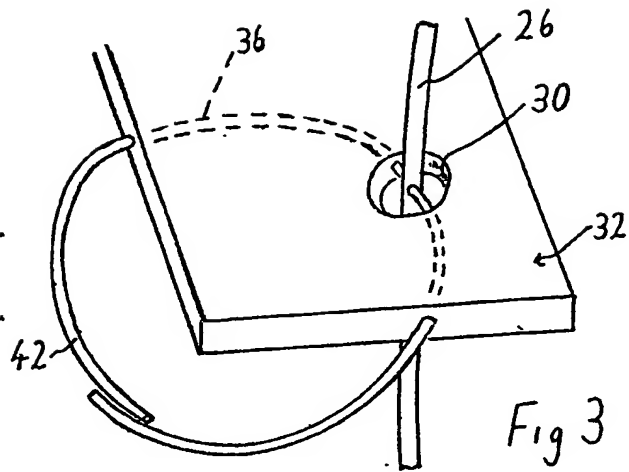
(57) A device for securing one or more cords, such as a shoe lace or a draw string of a ruck sack, has a body part 14,50 with passages through which the cord(s) 26 pass and blocking means 12,60 resiliently urged to positions at which they block movement of the cord(s) 26 through the body part. To reduce the length of trailing ends the distal parts of these are secured to the body part 14. This may be done by semi-permanent attachment of them to the body part 50 itself, e.g. by lugs 70, or to a separate end piece 32 readily attachable to and detachable from the body part 14 such as by a sliding fit with a dove tail connection.

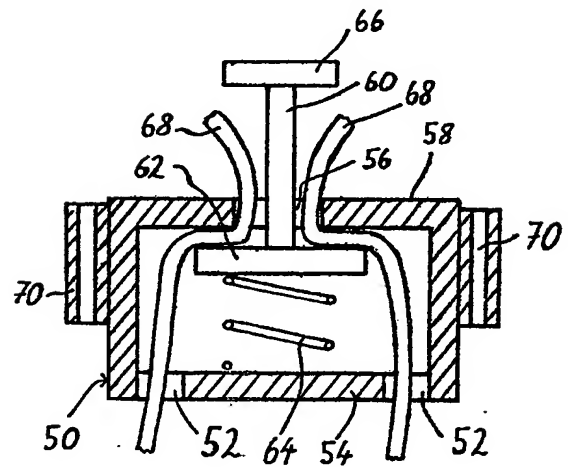
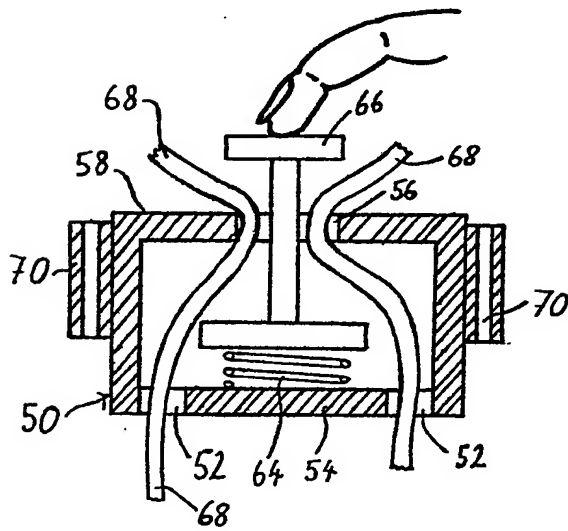
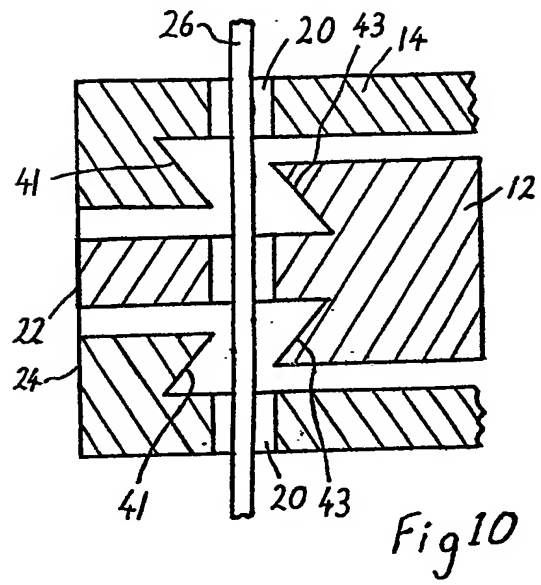
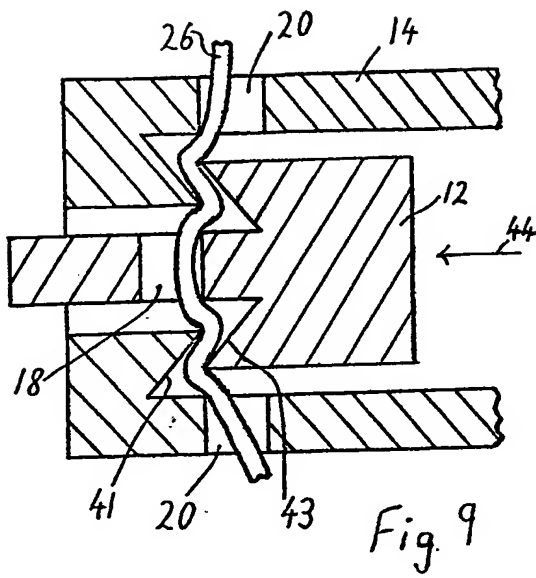


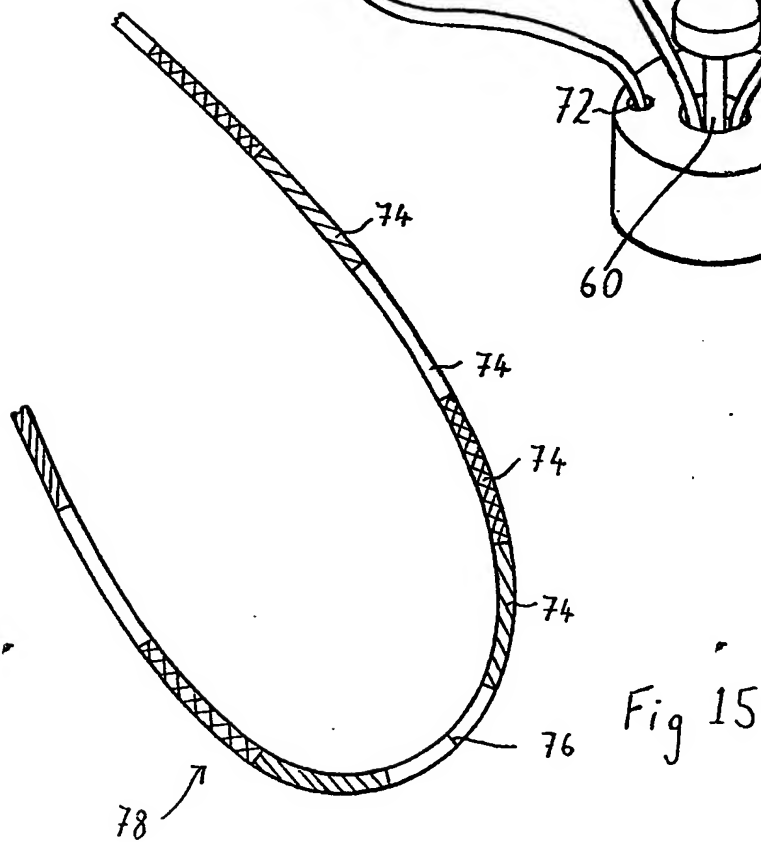
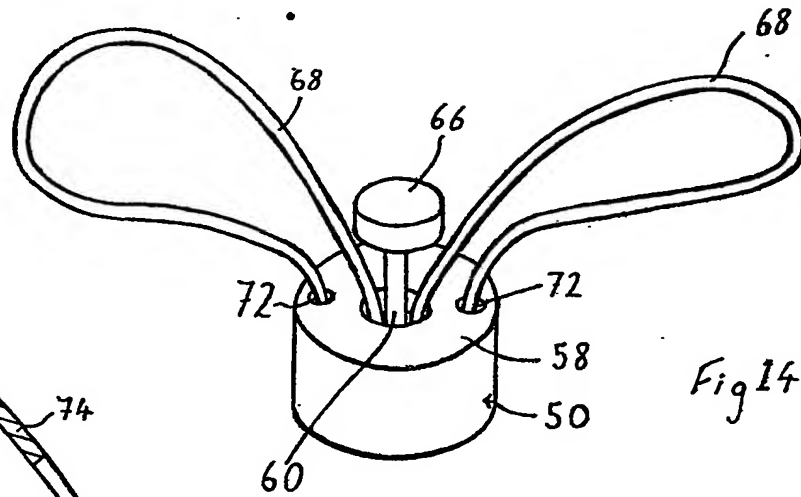
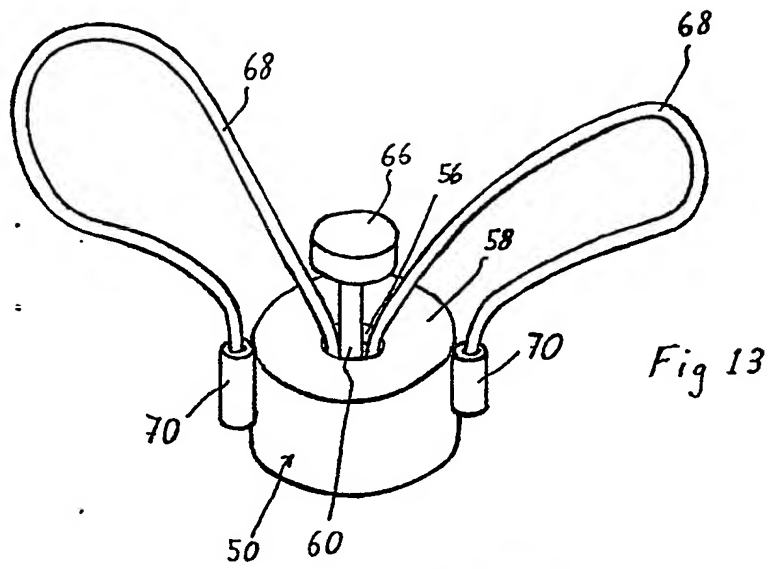
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## SPECIFICATION

### Cord securing device

- 5 The present invention relates to a device for securing one or more cords.

A device is known for fastening the drawstring around the neck of a rucksack. This device has a cylindrical body part and a captive piston slidable therein. A transverse hole in the piston can register with transverse holes in the body part but the piston is spring loaded to urge the holes out of register. The ends of the string pass through the transverse holes. The spring can run freely through the holes when a force is applied against the spring loading to bring them into register but is firmly clamped when the force is removed.

A device which operates in a similar manner is known for securing the lace on a shoe or boot. In this device two spring loaded pistons are mounted in a single cylinder. A transverse hole extends through each piston and, when a force is exerted against the spring loading, registers with respective entry and exit holes in the cylinder wall. The ends of a lace are threaded through the two respective passages formed by the holes in the pistons and the entry and exit holes in the cylinder wall so that the device can run freely along the lace when the force on the pistons is applied, but is held securely clamped in place when the force is removed and the holes are no longer in full register by virtue of the spring loading. The lace in a shoe or boot can thus be loosened by running the device away from the shoe or boot, and can be held taut by running the device up to the shoe or boot and releasing the force acting on the pistons against their spring loading.

I have now come to appreciate that it is necessary, in certain applications, for the cord to be of such a length that the inevitable loose end portions formed when the cord has been gathered or otherwise tightened are longer than desirable. For example, with the known device for securing a shoe lace, a minimum length is required to allow for slackening of the lace for removal and replacement of the shoe and yet this minimum length is so great that it may be a danger if allowed to trail freely.

According to the present invention I provide a device for securing one or more cords, the device including a body part member having one or more passages therethrough for receiving the cord or cords, blocking means resiliently urged towards a position blocking the passage or passages to clamp the cords between the body part and the blocking means so as to secure the cord or cords and movable relative to the body part against the resilience so as to open the passage or passages and allow movement of the cord or cords therethrough, characterised in that it further comprises attaching means to attach to the device an otherwise free portion or portions of the cord or cords which has passed through the passage or passages.

A particularly preferred form of the invention has an end-piece to which the free portion(s) of the cord(s) may be semi-permanently attached (being released only when it becomes necessary to renew

the cord) and which is attachable to an releasable from the body part member, for release as a preliminary whenever the cord(s) are to be released by operation of the blocking means. The form of attachment of the end-piece to the body part may depend on the use to which it is put. Where ease of handling is required the end-piece and the body part may engage by a simple sliding action or a snap fit. Where however secure attachment is of more importance a screw or spring clip connection may be desirable.

Instead of a detachable end-piece the otherwise free portions of the cords can be attached directly to the body part. The ends of the cords can for example be glued in holes or recesses provided in the body of the device, tied to one or more projections on the device or held in place by one or more clips or spring loaded pegs.

Whatever form of attachment means is employed, the portion of cord attached to the device is preferably its endmost portion so that a loop of cord is formed between its point of attachment and its exit from the passage.

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings (which are not to scale); wherein:-

*Figure 1* is a perspective view of an embodiment of cord securing device having two passages there-through for the respective parts of a shoe lace whose endmost portions are fastened to a detachable end-piece or toggle;

*Figure 2* is a vertical and longitudinal section through the embodiment of *Figure 1*, the section passing through the passages and showing the end-piece or toggle attached to the body of the device;

*Figures 3 to 10* illustrate various modifications of the embodiment of *Figures 1* and *2*;

*Figure 11* is a vertical section through a second embodiment showing an open passage through which parts of a shoe lace can pass;

*Figure 12* is the same vertical section as *Figure 11* but with the passage blocked and the laces secured;

*Figure 13* is a perspective view of the embodiment of *Figures 11* and *12*.

*Figure 14* shows in perspective a modification of the embodiment shown in *Figures 11* to *13*; and

*Figure 15* illustrates a form of shoe lace which can be used in any of the illustrated embodiments or their modifications.

Referring firstly to *Figures 1* and *2* the device 10 has two pistons 12 slidably held in a cylinder block 14 and urged outwardly and apart by a helical spring 16. A hole 18 extends transversely through each piston 12 such that on compressing the two pistons towards each other against the bias of the spring 16 each hole 18 registers respectively with two oppositely placed ports 20 in the cylinder block 14.

Full register between the holes 18 and their respective ports 20 occurs when the outer end face 22 of each piston 12 lies flush with its respective end face 24 of the cylinder block 14. On squeezing the two pistons 12 together between the finger and thumb of one hand two open passages are thus

formed in the device through which respective parts 26 of the lace can run freely. On releasing the pistons 12 the spring 16 moves the pistons outwardly blocking the passages and clamping the lace parts 26 between the cylinder block 14 and the pistons 12. On the top surface of the cylinder block 14 between the two ports a dovetailed and tapered projection 28 extends transversely across the block.

Each end most portion of the lace is threaded through a hole 30 formed in the toggle or end-piece 32 and held in the hole 30 by a spring pin 34 which pierces the lace and extends into a communicating passage 36. One surface 38 of the toggle 32 has an undercut and tapered dovetail groove 40 complementary to the projection 28. The wide end of the tapered groove 40 can be readily fitted over the narrow end of the tapered projection 28 and the entire toggle 32 slid onto the cylinder block 14 to form a wedge fit. The toggle 32 is of a greater length than the width of the block 14 so that the portions of the lace projection from the toggle 32 do not interfere with the wedge fit.

In use the device can be operated using one or two hands. When doing up a shoe lace the lace is first tightened and the two pistons 12 then squeezed together between the finger and thumb of one hand whilst the other hand (or the remaining fingers of the first hand) pulls the toggle 32 away from the cylinder block 14 while the block is pushed towards the shoe. The underside of the cylinder block 14 is concavely curved, as shown in Figures 1 and 2, so that a neat fit is achieved between the block and the shoe upper. On releasing the pistons the passages are blocked and the lace clamped. The toggle 32 is then slid on to the projection 28 until a firm wedge fit is maintained.

The illustrated device can, for example, be made of metal or of a plastics material. The dimensions of the device can be chosen with respect to its intended use although a spacing of about 16 mm between the ports 20 on the underside of the block 14 has been found in practice to be suitable for use with most sizes of shoes. The external shape of the block can be altered as desired and decorative motifs, for example for children's shoes, applied to it.

Many modifications can be made to the embodiment illustrated in Figures 1 and 2. Instead of being on the top surface of the block 14 the projection 28 can advantageously be positioned on the front vertical face of the block 14 to reduce the possibility of entanglement between parts of the lace issuing from the ports 20 and the wedge fit between the toggle 32 and the projection 28. In the illustrated embodiment however the position of the projection 28 has the advantage that the wedge fit is not dislodged, and may even be tightened, should a person wearing a shoe having the device momentarily catch the loop of the lace extending between the block 14 and the toggle 32 on an obstacle or otherwise apply a backward force to the toggle 32 (in Figure 1 the heel of the shoe would lie forward out of the page).

Figures 1 and 2 show the pistons 12 retained in the cylinder block 14 by the lace passing through the ports 20 and holes 18. This is a convenient arrangement as the pistons 12 can then be readily removed

to clean the device should any mud or dirt enter inside the cylinder block 14. However if a lace breaks in the vicinity of the cylinder block 14 or for any other reason it may be desirable to provide means independent of the lace to hold the piston in the block. Such means can for example comprise attaching the spring 16 to the pistons 12 and/or providing a recessed area or one or more longitudinal grooves on the cylinder inner wall away from each of its end faces 24 into which respective lugs on the piston can be snap fitted and can move along when the piston is moved by or against the force of the spring 16.

Reference will now be made to Figures 3 to 13 which illustrate further modifications of the embodiment of Figures 1 and 2 and in which like parts are given the same reference numerals as in Figures 1 and 2.

A wide range of means is available for holding the cord or lace in the end-piece or toggle 32 as shown by the examples illustrated in Figures 3 to 7. In Figure 3 a spring ring clip 42 passes through a passage 36 in a planar toggle 32 and pierces the lace which passes through the hole 30. In Figure 3 the passage 36 (shown by broken lines) lies in the plane of the toggle and the ring clip 42 pierces the lace as it passes through the hole 30. This construction is easy to fit and inexpensive to make. Another possibility would be for the ring clip to extend transversely through the toggle.

In Figure 4 a stud 46 is spring urged across the hole 30 through an end piece 32 so that in a like manner its head clamps the lace 26 against the opposite wall of the hole 30. A lace could similarly be held by a simple clamping screw extending across the hole 30.

In Figure 5 the lace 26 is clamped in the hole 30 passing through the end-piece 32 by means of a concentric cap 48 having a flared axial end which forms a wedge fit with the conical end of the end-piece 32. Screw threads are provided so that on screwing the cap 48 on to the end-piece the flared end of the cap compresses the conical end of the end-piece radially inwardly in the direction of the arrows 49 so as to clamp the lace.

In Figure 6 the lace passes through a hole 30 in an end-piece 32 in which the wall of the hole is toothed in an annular direction to prevent the cord being pulled out. Another possibility would be for the end-piece 32 to have a hole leading to a cup shaped cavity to house a knot in the lace which presents it from being pulled back through the hole.

Figures 7 to 10 illustrate some modifications which can be made to the internal shaping of the pistons 12 and the cylinder block 14. To increase the strength of the clamping of the parts of the lace 26 between the piston and the cylinder block the cross section of the inner cylinder wall need not be constant, but can include a step at the exit and/or entrance ports to give a change in the cross sectional area of the piston. Each of Figure 7, to 10 shows a piston and cylinder arrangement in which a spring loading acting in the direction of the arrow 44 biases the piston 12 towards a blocking position so as to clamp the lace. In Figure 7 the piston 12 and cylinder 14 have a complementary inclined step in their cross-

sectional areas so that the lace is clamped between the mutually opposing and inclined walls 41, 43 of the piston 12 and cylinder 14.

In Figure 8 a right angled step in the cross section of the piston 12 and the cylinder 14 causes the parts 26 of the lace to be clamped between opposing walls as well as between co-acting edges of the piston and cylinder. In Figures 9 and 10 the stepped opposing walls 41, 43 of the piston and cylinder have a matching tooth and groove arrangement so that the lace is clamped at a plurality of points on each side of the hole 18. Figure 10 shows the arrangement of Figure 9 with the piston 12 moved relative to the cylinder block 14 against the bias of the spring force so as to open the passage and allow the lace to run freely through it.

The transverse cross section of the illustrated piston and cylinder arrangements can be of any convenient shape. A non-circular section, for example rectangular as shown in Figure 1, is preferred to prohibit rotation of the pistons in the cylinder block and consequential misalignment of the ports 20 and the hole 18.

Referring now to Figures 11 to 13 a cylinder block 50 has two entrance ports 52 in its base 54 and a single exit port 56 in its top surface 58. A piston rod 60 extends with clearance through the port 56 and carries at its lower end a piston plate 62 which is too large to pass through the port 56 but is biased towards it by a helical spring 64 acting against the base 54. A disc 66 at the other end of the piston rod 60 serves as a knob for operating the device. When no force is applied against the knob the piston plate 62 clamps parts 68 of a lace, which extend through respective ports 52 and the single port 56, against the cylinder wall so that the lace is firmly held. On depressing the knob against the bias of the spring 64, as shown in Figure 11, an open passage is formed through which the parts 68 can run freely.

On the outside of the cylinder block 50 are two tubular compartments 70 fixed to the cylinder's axial wall. The endmost portions of the lace are inserted in respective compartments 70 and glued permanently in place. A modification of the attaching means is shown in the embodiment illustrated in Figure 14 in which, instead of two compartments on its axial outside wall, two holes 72 are drilled vertically into the side wall of the cylinder block 50. The endmost portions of the lace are inserted in respective holes 72 and glued in place.

In use the two embodiments illustrated in Figures 11 to 14 can each be operated using one or two hands and are manipulated in an identical fashion. On depressing the knob the parts 68 of the lace run freely through the device which can then be run up to the shoe. Release of the knob allows the spring 64 to urge the piston plate 62 against the upper cylinder wall to clamp the lace tight. Conversely on depressing the knob the device can be run along parts 68 of the lace away from the shoe to allow slackening of the lace and removal of the shoe.

It will be appreciated that many modifications may be made to the embodiments specifically described above without thereby departing from the scope of the invention. Possible modifications include the use

of a tension spring or magnets instead of the illustrated helical spring to provide the resilient loading required by the piston(s), and the adaptation of the attaching means so that each cord can be attached more than once to the body of the device or so that it is attached at a point removed from its endmost portion so as to simulate a bow and, in either case, thus dispose of very long ends of cords. Furthermore the features illustrated with respect to any one embodiment may be included in any other embodiment. For example, in place of the end-piece used to attach the lace to the cylinder block shown in Figures 1 and 2 or Figures 7, 8, 9 and 10 the cylinder block or pistons may carry one or more tubular compartments as illustrated in Figures 11 to 13, or be drilled with one or more holes as in Figure 14, to receive the endmost portions of the lace. Conversely either of the embodiments shown in Figures 11 and 14 may include a detachable toggle or end-piece and means with which to attach it to the body part of the device in place of the illustrated permanent attachment. Other modifications which can be made to the embodiments of Figures 11 to 14 include altering the portion of the passage formed between the upper surface of the piston plate 62 and the opposing surface of the cylinder block 50 in a manner similar to any of the variations shown in cross section in Figures 7 to 10 with respect to the embodiment of Figures 1 to 2.

The present invention can thus provide a cord securing device which is rapid and easy to use in practice. Sufficient spare cord can be made available for undoing the tightly gathered neck of a rucksack or the like, e.g. a tent bag or a tightly laced shoe, without leaving long trailing ends and creating a danger or an unsightly finish. It is envisaged that the present invention will have many uses, particularly specialised uses where certain properties are required. For example the device can provide an easy and acceptable method of securing shoe laces of people such as children and those with a disablement or debilitating disease, e.g. rheumatism or hemiplegia, who would not otherwise be able to secure their own laces. It can also be easily operated by a person wearing gloves and allows such a person to change their shoes rapidly when out of doors in inclement weather. The device is in addition particularly applicable to a person who is frequently changing shoes or who requires reliability in the securing of their laces. Examples of these categories are sportsmen and anyone doing active work, e.g. military and police work.

A further advantage that can be obtained in the present invention is the reproducibility of the tension which is achieved in the lace. By using a striped lace, for example a lace such as that illustrated in Figure 15 in which the three-coloured pattern of stripes 74 is symmetrical about the mid-point 76 of the lace 78, or by marking a plain lace, the device can be run up each time to exactly the same position adjacent the shoe. This property may be of use to sportsmen or to those having an injured foot or ankle which requires constant pressure to be applied against the skin.

## CLAIMS

1. A device for securing one or more cords, the device including a body part member having one or more passages therethrough for receiving the cord or cords, blocking means resiliently urged towards a position blocking the passage or passages to clamp the cords between the body part and the blocking means so as to secure the cord or cords and movable relative to the body part against the resilience so as to open the passage or passages and allow movement of the cord or cords therethrough, characterised in that it further comprises attaching means to attach to the device an otherwise free portion or portions of the cord or cords which has passed through the passage or passages.
2. A device according to Claim 1 having an end-piece for the attachment thereto of the free portion or portions of the cord or cords, and the attaching means releasably attaches the end-piece to the body part member.
3. A device according to Claim 2, wherein the end-piece and the body part engage by a sliding action.
4. A device according to Claim 2, wherein the end-piece and the body part engage by a snap fit.
5. A device according to Claim 2, wherein the end-piece and the body part are connectable by means of a screw.
6. A device according to Claim 1, wherein the end or ends of the cord or cords attach directly to the body part.
7. A device according to any one of the preced-

- ing claims, wherein the body part is hollow with an open ended cavity extending therethrough, the said passages including extending transversely through walls of the cavity and the blocking means comprising a pair of pistons slidable within the cavity, and resiliently urged to respective positions each projecting out of an open end of the cavity, the pistons having transverse holes positioned to register with the parts in the walls of the cavity when urged into the cavity against the resilience.
8. A device according to any one of claims 1 to 6, wherein the body part has a hollow interior and the passages include a part giving access to the interior through one face of the body part, the blocking means comprising a piston extending with clearance through the part to a plate dimensioned so as to be unable to pass through the port and resiliently urged against the walls of the body part adjacent the port, the plate being movable away from the port by pressure on the piston.
9. A device for securing one or more cords substantially as any herein described with reference to any of Figures 1 to 14.
10. A device according to any one of the preceding claims in combination with a lace or cord having markings distributed along its length.
11. A shoe having a shoe lace and a device according to any one of Claims 1 to 9 for securing the lace.
12. A rucksack or other flexible bag having a drawstring to close an opening of the bag and a device according to any one of Claims 1 to 9 for securing the drawstring.